MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Permitting and Compliance Division
Water Protection Bureau
P.O. Box 200901
Helena, MT 59620-0901

Permit Fact Sheet
Montana Ground Water Pollution Control System (MGWPCS)

PERMITTEE:	Glacier National Park
PERMIT NUMBER:	MTX000171
FACILITY NAME:	St. Mary Wastewater Facility
FACILITY LOCATION:	East Glacier Area, St. Mary Ranger Station Developed Area, St. Mary, MT 59417
SOURCE LOCATION:	Southwest ¼, Southwest ¼ of Section 34, Township 35 North, Range 14 West, Glacier County.
CONTACT:	Michael O. Holm, Superintendent P.O. Box 128 West Glacier, MT 59936 Phone: (406)888-7901 and (406)888-5817 Fax: (406)888-7904
RECEIVING WATER:	Class I
NUMBER OF OUTFALLS:	one (1), For the purpose of fee determination
OUTFALL(s)/TYPE:	001 – Slow Infiltration/Percolation-Evaporation Ponds #1 002 – Slow Infiltration/Percolation-Evaporation Ponds #2 003 – Slow Infiltration/Percolation-Evaporation Ponds #3 004 – Slow Infiltration/Percolation-Evaporation Ponds #4

I. PERMIT STATUS

The statement of basis is for the issuance of a new wastewater discharge permit for the existing St. Mary Wastewater Facility (SMWF) pursuant to the Montana Ground Water Pollution Control System (MGWPCS). The permittee is Glacier National Park (GNP).

The wastewater treatment facility was constructed prior to May 1, 1998, and was not subject to certain permitting requirements currently associated with the Montana Water Quality Act at the time of construction. Violations of the Clean Water Act regarding the unpermitted discharge of untreated wastewater to St. Mary Lake and the St. Mary River from the Rising Sun sewer collection system

(complaint dated October 23, 1997) have been corrected. In addition, a current upgrade to the treatment system will include replacing the original chlorine disinfection system with ultraviolet (UV) treatment.

GNP submitted a GW-1 ground water permit application that was received by the Department on October 6, 2005. Requests for supplemental information were made by the Department on November 15, 2005, followed by a second letter on January 4, 2006. Effluent analytical data from the wastewater treatment plant for the 2006 season was submitted to the Department on October 30, 2006. Current (2006) ground water monitoring analytical data accompanied this submittal. On January 26, 2007, the Department received the results of a shallow aquifer pump test conducted onsite in ground water monitoring well MW-3. The application was determined to be complete on March 19, 2007.

II. FACILITY INFORMATION

A. General Description

St. Mary is located on the east side of GNP. The wastewater treatment facility is situated between Divide Creek and Saint Mary Lake.

The SMWF is a mechanical wastewater treatment plant that uses an activated sludge treatment process with extended aeration. The facility receives domestic sewage from GNP facilities at St. Mary, Logan Pass, nearby camp areas (i.e., Rising Sun, Saint Mary), the Rising Sun Motor Inn (includes cabins and restaurant), and the Hudson Bay housing area. Plant operation is on a seasonal basis from May1 to September 30. During the winter months (October 1 to April 30), the limited amount of wastewater generated from year-around residences is collected in a series of two community septic tanks (16,000-gallon primary tank and 8,000-gallon secondary tank) prior to discharging to a subsurface drainfield.

B. Wastewater Collection, Treatment, and Disposal

The wastewater collection system consists of gravity collection lines that flow to three lift stations (see Attachment 1). The Rising Sun (RS) lift station receives wastewater from the RS campground which includes a recreational vehicle (RV) dump station, and a coffee shop that has a grease trap, the RS motor-traffic areas, and the waste hauled from Logan Pass. Wastewater from the RS lift station enters a force main where it is pumped to the St. Mary campground lift station, which also receives wastewater from the St. Mary campground and RV dump station. The third lift station receives wastewater from the St. Mary visitor center. Wastewater from the St. Mary housing and administrative area and a vehicle wash-bay gravity flows directly to the treatment facility. RV dump station wastewater is considered to be high strength waste, however when it enters the collection system it is significantly diluted with regular domestic strength sewage.

Design criteria for the wastewater treatment facility are listed in Table 1.

Table 1. Current Design Criteria Summary – St. Mary WWTF

Facility Description: Three aeration basins, activated sludge treatment, four slow infiltration/percolation (I/P) ponds.	
Construction Date: June 1982	Modification Date: UV under constr.
Design Year: June 1978	
Design Population: summer is transient, in winter plant is shut-down	Population Served: 60 resident + visitor transient population
Annual Average Design Flow: 0.107 mgd	Peak Design Flow: 0.107 mgd
Primary Cells: three aeration basins	Secondary Cells: 4 IP ponds
Minimum Detention Time (System) (days): 20	
Design BOD_5 Removal (%): 85	Design Load (lb/day): 241
Design SS Removal (%): 85	Design Load (lb/day): 196
Collection System: gravity with lift stations	
SSO Events (Y/N): N	Number: 0
Bypass Events (Y/N): N	Number: 0
Inflow Flow (mgd): 0.036	Source: level sensor at V-notch weir
Disinfection: yes, will be installed for Fall of 2007	Type: UV
Discharge Method: continuous seasonal	
Effluent Flow Primary Device: Fischer Porter Totalizing Flow Meter	
Recording Device: totalizer	
Sludge Storage: concrete drying beds	
Sludge Disposal: Glacier Gold Compost	EPA Biosolids Permit: MTG650043

The collection system conveys all wastewater from the GNP St. Mary facilities to a "wet well" located inside the treatment plant. From the wet well, sewage is pumped to the plant headworks.

At the treatment plant, raw sewage and wastes receive preliminary treatment in a comminuter (see Attachment 2) to remove settleable and floatable materials. The wastewater is oxygenated in three separate aeration basins where the suspended biomass enhances nitrification. Aeration can be applied intermittently to create anoxic conditions that also facilitate denitrification.

Liquids go to a clarifier and will receive ultraviolet (UV) disinfection treatment prior to being metered and discharged to the infiltration/percolation-evaporation (IP) ponds. Activated sludge is returned to the aeration basins to promote growth of the biomass, while the waste activated sludge is treated in a sludge digester using aerobic solids digestion processes. Sludge from the digester, as well as sludge from the IP ponds goes to concrete-lined drying beds. The drying beds are constructed with PVC pipe underdrains. Subnatant from the drying beds and the digester is returned to the aeration basins to be re-routed through the treatment system (see Attachment 2). Approximately 14,740 pounds per year (50 to 80% solids by weight) of dried sludge is hauled off-site to a licensed compost facility.

Effluent from the treatment system goes to the IP ponds. These ponds allow effluent to slowly percolate through the unsaturated zone providing natural treatment in the soils and subsoils prior to reaching the

shallow ground water. Currently, the effluent is discharged to two (2) of the four (4) IP ponds, because the valves to IP Ponds #2 and #4 have been seized in the open position for an unknown period of time. The discharge to these two (2) ponds is approximately 40,000 gpd, total. According to the permittee (correspondence dated March 2, 2006), these valves will be replaced as soon as possible (see Part XI "Compliance Schedule" of this statement of basis). At that time, GNP intends to use all four (4) IP ponds once there are isolation capabilities for all of the ponds. Influent flow is measured using a level sensor (calibrated at the factory) at the V-Notch weir. Effluent flow is measured using a Fischer Porter Totalizing Flow Meter (Md. 51A1102DBBXXX), prior to being discharged to the IP ponds.

The average daily flow for the treatment system is 107,000 gallons per day (gpd) (e.g., 0.107 mgd) [ARM 17.30.1345(2)(a)]. The average daily flow based on the four (4) months of operation in 2006 was 36,374 gpd. Due to the seasonal nature of the operation of GNP, effluent flows are expected to vary greatly (see Part III.B.3 of this statement of basis for additional data).

A French drain has been used in the past to dispose of storm water and precipitation that has fallen in the plant tanks during the winter months after plant shutdown. The following spring prior to activation of the wastewater treatment facility, any precipitation that has accumulated in the plant basins was discharged to the IP ponds. According to the permittee, piping will be added this year so that all wastewater from shutdown and winter storm water will be receiving complete treatment in the system the following spring.

III. DESCRIPTION OF THE DISCHARGE

A. Outfall Location

The proposed permit authorizes the permittee to discharge residential strength wastewater from an activated sludge-aerobic digestion treatment system to four (4) slow IP ponds (Outfall 001, 002, 003, and 004) that are located west of the wastewater treatment plant in the Southwest, Southwest of Section 34, Township 35 North, Range 14 West in Glacier County at 48 degrees 44.447 minutes North latitude (48° 44 min. 27.6 sec.), and 113 degrees 25.937 minutes West longitude (113° 25 min. 56.3 sec.). [N48.7410, W113.4323]

- Outfall 001 is the northeast pond, and has been identified in the past as IP Pond #1 by the permitte.
- Outfall 002 is the northwest pond, and has been identified in the past as IP Pond #2 by the permittee.
- Outfall 003 is the southeast pond, and has been identified in the past as IP Pond #3 by the permittee.
- Outfall 004 is the southwest pond, and has been identified in the past as IP Pond #4 by the permittee.

B. Past Monitoring Data/Effluent Characteristics

1. Effluent Characteristics

The effluent that is discharged from a well operated activated sludge system involving a continuous-flow, suspended-growth aerobic process with extended aeration units is expected to have the following average chemical characteristics [USEPA, (TFS 1-5), 2002]:

- Total Nitrogen (sum of nitrate + nitrite, plus total Kjeldahl nitrogen [TKN], as N): 30 to 40% removal with an average concentration in residential units ranging from 17 to 40 mg/L.

- Phosphorous: 10 to 20 % removal rate
- Biological Oxygen Demand (BOD): 10 to 50 mg/L
- Total Suspended Solids (TSS): 15 to 60 mg/L
- Fecal Coliform Bacteria and virus: 1 to 2 logs removal

2. Past Monitoring Data/Effluent Characteristics

Table 2 summarizes the self-monitoring effluent data reported by the SMWF for June through September 2006 from Outfall 001 through 004. Based on this analytical data, the SMWF exceeds the efficiency values set forth in the USEPA Manual. The average daily flow for June was 32,093 gpd, July was 46,277 gpd, August was 40,848 gpd, and September was 24,889 gpd. The average daily flow for the four (4) summer months of operation in 2006 was 36,373.95 gpd.

Table 2: Influent and Effluent Characteristics [(1)] for June through September 2006

Parameter	Location	Units	Previous Permit Limit	Minimum Value	Maximum Value	Average Value	Number of Samples
Flow, Daily Average	Influent	mgd	NA	0.0072	0.0763	0.0364	119
Biochemical Oxygen Demand (BOD_5)	Influent	mg/L	NA	86.4	147.6	111.8	9
	Effluent	mg/L	NA	6.2	72	20.5	7
		% removal	NA	47	95.8	82.2	6
	Effluent	lb/day	NA	1.8	23.8	6.5	7
Total Suspended Solids (TSS)	Influent	mg/L	NA	24	336	78.5	11
	Effluent	mg/L	NA	0.22	16.5	4.8	40
		% removal	NA	65.7	98.3	86.4	7
	Effluent	lb/day	NA	0.02	4.3	1.4	40
Fecal Coliform Bacteria [(5)]	Effluent	Number per 100 mL	NA	14,300	TNTC	34,766.7	3*
pH	Effluent	s.u.	NA	6.2	8.8	7.3	111
Temperature	Effluent	ºC	NA	NA	NA	NA	0
Total Residual Chlorine	Effluent	mg/L	NA	NA	NA	NA	0
Total Ammonia as N	Effluent	mg/L	NA	0.23	27.7	7.8	12
Total Kjeldahl Nitrogen	Effluent	mg/L	NA	27.4	27.4	27.4	1
Nitrate + Nitrite as N	Effluent	mg/L	NA	0.2	34.5	10.2	12
Total Nitrogen, as N (TN)	Effluent	mg/L	NA	27.6	27.6	27.6	1
		lb/day	NA	9.2	9.2	9.2	1
Total Phosphorus as P	Effluent	mg/L	NA	NA	NA	NA	0
		lb/day	NA	NA	NA	NA	0
Dissolved Oxygen	Effluent	mg/L	NA	NA	NA	NA	0
Oil and Grease	Effluent	mg/L	NA	NA	NA	NA	0
Total Dissolved Solids	Effluent	mg/L	NA	NA	NA	NA	0

Footnotes: NA - Not available

(1) Conventional and Non-conventional Pollutants only, table does not include information on toxic pollutants.

* Too Numerous to Count (TNTC) value not included in average.

IV. SITE CHARACTERISTICS

A. Soils

Soils in the area of the IP ponds are classified as Bearmouth gravelly loam (Bg) associated with 0 to 4 percent slopes.

B. Geology

The "facility is underlain by coarse sand, gravel, and boulders deposited as an alluvial fan by Divide Creek." (USGS,1982).

C. Hydrogeology

In 1979, four observation/monitoring wells were installed in the area of the IP ponds. The total depth of these wells ranged from 44 feet in SM-1, to 80 feet in SM-3 and SM-4. SM-2 was drilled to 75 feet. The "SM" well designation was used by Moreland and Wood, in the1982 study. DEQ-WPB will refer to these wells using an "MW" identifier. These wells were completed with 20 feet of screen from the bottom of the well. Three (MW-1, 2 and 4) of the four ground water monitoring wells installed in the vicinity of the IP ponds were drilled and completed in gravel. Monitoring well MW-3 (the most northerly of the four wells) was completed in sand and gravel.

The permittee has stated in the GW-1 application form (October, 2005) that the depth to shallowest ground water is 19.89 feet below ground surface (bgs) at the IP ponds. The ponds are constructed two feet bgs. In 1980, the reported depth to water (DTW) in the wells ranged from:

20 to 30 feet bgs in MW-1,
40 to 49 feet bgs in MW-2,
38 to 48 feet bgs in MW-3, and
42 to 54 feet bgs in MW-4.

The above ground water level ranges encompass the approximate 10 feet of seasonal fluctuation (late spring is high water to late summer low water) with the ground water levels receding to the level of Saint Mary Lake. Recharge from Divide Creek is significant during spring runoff.

The most recent static water levels (SWLs) and monitoring well elevations were measured on April 9, 2007, by the permittee (see Table 3).

Table 3. Current Monitoring Well Ground Water Measurements

Monitoring Well #	Static Water Level (feet), measured 4/9/07	Well Elevation, in feet above mean sea level	Ground Water Elevation as of 4/9/07
MW-1	26.00	4542.2	4516.2
MW-2	43.63	4489.2	4445.6
MW-3	40.82	4491.0	4450.2
MW-4	47.36	4492.2	4444.8

D. Hydrology

A constant rate (63 gpm) 12-hour aquifer pump test was conducted by Western Groundwater Services, LLC on December 5, 2006 in monitoring well MW-3 (SM-3). The hydraulic conductivity (K) of the shallow aquifer was calculated at 1,825 ft/day using the 20 feet of well screen to reflect the thickness of the aquifer since this is where the ground water flow was probably concentrated during the aquifer pump test.

Based on ground water elevations measured in each of the four monitoring wells as provided in the Mooreland and Wood (1982) USGS report, the direction of ground water flow in the area of the St. Mary wastewater treatment plant is to the northwest (approximately N45°W), from Divide Creek to St. Mary Lake (see Attachment 3). This ground water flow direction was re-confirmed by the permittee according to the updated SWLs and re-surveyed monitoring well elevation data collected in April 2007 (see Table 3). Between MW-4 and MW-2, the hydraulic gradient is 0.005 ft/ft, becoming steeper to the east due to lower transmissive aquifer material and/or a higher rate of discharge from Divide Creek.

The nearest hydraulically downgradient surface water is St. Mary Lake located 2,670 feet west of the treatment facility outfall(s). Divide Creek is 370 feet to the east of the outfall(s).

V. RECEIVING WATER

A. Water-Use Classification and Applicable Water Quality Standards

Ground Water
Random ground water samples have been collected from the four ground water monitoring wells located around the facility and the IP ponds since 1980 (prior to facility construction). A variable mix of parameters was analyzed for each sampling event. The most recent ground water samples from the four ground water monitoring wells were collected on June 29, 2006 and September 13, 2006. Nitrate (as N) concentrations ranged from 0.10 mg/L in MW-1 (September), to 0.28 mg/L in MW-4 (June), with an average concentration of 0.18 mg/L. Samples were also collected in May 29, 1980, and in August and September 2005. Historically, nitrate (as N) concentrations in the ground water samples collected from these monitoring wells have all been less than 1.0 mg/L nitrate (as N).

Specific conductivity was measured in 1980 and 1987. These values ranged from 290 umhos/cm (MW-2 in 1987) to 410 umhos/cm (MW-1 in 1980).

Based on the above range of specific conductivity values, the receiving water for Outfall 001 through 004 is Class I ground water. Class I ground water has a specific conductivity of less than or equal to 1,000 μmhos/cm at 25 degrees Centigrade, as defined by ARM 17.30.1006(1). According to ARM 17.30.1006(1)(a), the quality of Class I ground water must be maintained so that these waters are suitable for public and private water supplies, culinary and food processing, irrigation, commercial and industrial purposes, drinking water for livestock and wildlife, with little or no treatment. Human health standards listed in DEQ Circular 7 (February 2006) apply to concentrations of dissolved substances in Class I ground water.

The applicable ground water quality standards and maximum allowable changes based on beneficial use criteria [ARM 17.30.1006(1)] are included in Table 4.

Table 4. Applicable Water Quality Standards

Parameter, units	DEQ Circular 7 Human Health Standards	Beneficial Use: ARM 17.30.1006(1)
Nitrate (as N), mg/L	10	NA
Total Phosphorus, mg/L	"narrative"	NA
E-Coli Bacteria	<1 per 100 ml	NA
Specific Conductivity, μohms/cm	NA	1,000

NA = not applicable

Surface Water

Divide Creek is located 370 feet east of the treatment facility along the GNP-Blackfeet Tribe property boundary. Since this creek is not wholly located inside GNP, it is in the Hudson Bay Drainage and has a B-1 surface water use classification (ARM 17.30.613). According to ARM 17.30.623(1), "Waters classified B-1 are to be maintained suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propogation of salmonid fishes and associated aquatic life, water fowl and furbearers; and agricultural and industrial water supply." Divide Creek is hydraulically upgradient from the treatment facility and should not be impacted by the ground water discharge from the IP ponds/outfall(s).

St. Mary Lake is located 2,670 feet hydraulically downgradient from the four IP ponds/outfalls. St. Mary Lake is within the GNP boundary and is designated as "outstanding resource waters" (ORW) due to its environmental, economic, and ecological value (75-5-315, 316, MCA). According to ARM 17.30.617(1), "all state surface waters located wholly within the boundaries of designated national parks or wilderness areas as of October 1, 1995, are outstanding resource waters (ORWs)."

The water quality of St. Mary Lake is extremely good to nearly pristine (Ellis, 1992). Water to the lake is snow-melt dominated. Although the stream gradient decreases at the mouth of the lake, the extensive exposure of resistant bedrock with minimal amounts of unconsolidated materials keeps total dissolved solids (TDS) and specific conductivity low in the surface water.

Low solute concentrations in the alpine lakes in GNP have little capacity to produce plant biomass and are therefore, very sensitive to changes in nutrient inputs [Clark (USGS), 2000]. Alpine lakes in GNP are "oligotropic to ultraoligotrophic because of low inputs in bioavailable phosphorous. Thus, these lakes will be extremely sensitive to human-induced phosphorous loading"(Ellis, 1992). Atmospheric inputs have been identified as a probable source for nitrate in this area [Clark (USGS), 2000].

VI. MIXING ZONE

The permittee has proposed to continue to discharge all wastewater from Outfall 001 through 004 and has requested a standard, 500-foot mixing zone (ARM 17.30.517) for Outfall 001 through 004. The permittee must comply with the ground water mixing zone rules pursuant to ARM Title 17, Chapter 30, Subchapter 5.

The shape of the mixing zone is determined using the dimensions of the IP ponds and information on water table elevations and topography. The shallow ground water flow direction is N45°W, and the

hydraulic gradient is 0.005 ft/ft (see Part IV.D. of this statement of basis for details). The width of the IP ponds perpendicular to the direction of ground water flow is 360 feet.

A standard 500-foot ground water mixing zone will be granted for an individual parameter of nitrate, as N.) [ARM 17.30.505(1)(a)].

VII. PROPOSED EFFLUENT LIMITS

A. Technology-Based Effluent Limitations (TBELs)

National Secondary Standards (NSS) as described in 40 CFR 133 have been incorporated by reference to apply to all facilities treating sewage in Montana [ARM 17.30.635 and ARM 17.30.1344(2)(h)]. Secondary treatment is defined as the minimum level of effluent quality attainable as measured by BOD_5, TSS, percent removal of BOD_5 and TSS, and pH.

The secondary treatment standards, specified in 40 CFR 133.102, are shown in Table 5. These are the proposed limits for BOD_5 and TSS. Based on the required sampling frequency, the more stringent limits will apply.

Table 5. Proposed Technology-Based Effluent Limitations for Outfalls 001 through 004

Parameter	Concentration (mg/L)	
	7-day Average[1]	**30-day Average** [1]
BOD_5	45	30
TSS	65	30
pH (s.u.)	Within the range of 6.0 to 9.0 s.u. (instantaneous minimum and maximum)	
BOD_5 Removal Efficiency (%)	---	85 %
TSS Removal Efficiency (%)	---	85%

(1) See Part V. of the permit for explanation of terms

85% removal requirement for BOD_5: The arithmetic mean of the BOD_5 for effluent samples collected in a period of 30 days that shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitation on BOD_5.

85% removal requirement for TSS: The arithmetic mean of the TSS for effluent samples collected in a period of 30 days that shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitation on TSS.

TBELs apply to Outfall 001 through 004 because they are located approximately 2,670 feet from St. Mary Lake and may be hydrologically connected to the lake [Administrative Rules of Montana [(ARM) 17.30.506(2)(h)].

Technology-Based Effluent Limitations – Basis for Mass-Based Load Limit Calculations

The annual average design flow of 0.107 mgd will be used to calculate the mass-based load limitations for BOD_5 and TSS. These load limits are for Outfall 001 through 004.

Load (lb/day) = Design Flow (mgd) x Concentration (mg/L) x Conversion Factor (8.34)

BOD_5:

30-d	Load =	107,000 gpd x 30 mg/L x 8.34 x 10^{-6}=	26.8 lbs/day
7-d	Load =	107,000 gpd x 45 mg/L x 8.34 x 10^{-6}=	40.2 lbs/day

TSS:

30-d	Load =	107,000 gpd x 45 mg/L x 8.34 x 10^{-6}=	40.2 lbs/day
7-d	Load =	107,000 gpd x 65 mg/L x 8.34 x 10^{-6}=	58.0 lbs/day

Table 6 lists the load limits for Outfall 001 through 004. Based on the required sampling frequency, the more stringent limits will apply.

Table 6. Load Limits for Outfall 001 through 004

Parameter	Load (lbs/day)	
	7-day Average[1]	**30-day Average** [1]
BOD_5	40.2	26.8
TSS	58.0	40.2
(1) See Part V. of the permit for explanation of terms		

VIII. PROPOSED WATER QUALITY-BASED EFFLUENT LIMITS

The Montana Water Quality Act requires that a discharge to state waters shall not cause a violation of water quality standards. Water quality limitations must be established in permits to control all pollutants or pollutant parameters that are or may be discharged at a level which will cause, have reasonable potential to cause or contribute to an excursion above any state water quality standard. The permittee must comply with Montana Numeric Water Quality Standards included in DEQ Circular 7 (February 2006) and the protection of beneficial uses (ARM 17.30.1006).

A. Nitrate

The Class I ground water is considered high quality water and is subject to Montana's Nondegradation Policy (75-5-303, MCA). The applicable ground water standard is based on nondegradation, with a nitrate concentration limit of 7.5 mg/L [ARM 17.30.715 (1)(d)(iii)] at the end of the proposed standard, 500-foot mixing zone.

The total nitrogen (TN) concentration is the sum of nitrate plus nitrite, as nitrogen (N) plus total Kjeldahl Nitrogen (as N). The Department assumes all the nitrogen discharged to the drainfield in the effluent is converted to nitrate, as (N).

The allowable discharge concentration is derived from the mass balance water quality equation which considers dilution and background concentration of the receiving water (EPA, 2000).

$$C_2 = \frac{C_3(Q_1 + Q_2) - C_1 Q_1}{Q_2}$$

C_2 = 52 mg/L

C_1 = average ambient ground water concentration is 0.18 mg/L
C_2 = allowable discharge concentration (TN) beneath the drainfield
C_3 = ground water concentration limit for pollutant (from DEQ Circular 7 or other appropriate water quality standard) at the end of the mixing zone is 10.0 mg/L, instantaneous (no single sample shall exceed)
Q_1 = ground water volume is 61,251.56 ft^3 / day
Q_2 = maximum flow of discharge (design capacity of system is 14,305 ft^3 / day)

The volume of ground water that will mix with the discharge (Q_1) is estimated using Darcy's equation: Q_1 = K I A. The calculated value of Q_1 is 61,252.56 ft^3/day for the mixing zone. This is based on an aquifer K value of 1,825 ft/day (12-hour pump test), a measured hydraulic gradient of 0.005 ft/ft, and a cross sectional area of flow at the downgradient boundary of the standard 500-foot mixing zone of 6,712.5 ft^2.

The design capacity of the wastewater disposal system is 107,000 gpd, or 14,305 ft^3/day. The nitrate (as N) concentration must not exceed 10 mg/L at the end of the mixing zone. The average ambient concentration of nitrate-nitrogen in the alluvial ground water is 0.18 mg/l. It is assumed that the entire TN load in the effluent converts to nitrate (as N) and enters the ground water.

As discussed in Part VII, nitrate reduction of approximately 7 percent is assumed to occur beneath the IP ponds. Therefore, to discharge a TN concentration of 52 mg/L below the IP ponds, the effluent limit from the extended aeration-activated sludge treatment system at the effluent sampling location prior to discharge to the IP ponds is calculated at 55.6 mg/L of TN.

52 mg/L (.07) = 3.64 mg/L	Assumed nitrate reduction beneath the IP ponds.
52 mg/L + 3.64 mg/L = 55.6 mg/L	Maximum concentration of TN prior to discharge to the IP ponds (Outfall 001 through 004).

The calculated effluent concentration of TN must not exceed 55.6 mg/L at the annual average design flow in order to maintain a concentration that is less than the state water quality standard of 10 mg/L for nitrate (as N) in the ground water at the mixing zone (Part VI) boundary. The WQBEL will be expressed as load (lbs/day) based on the design flow of the system [107,000 gpd, see ARM 17.30.1345(2)(a)] and the daily maximum concentration (mg/L) as follows:

Load limit (lbs/day) per outfall	*= design capacity (gpd) **x** daily maximum effluent concentration (mg/L) **x** 8.34 x 10^{-6}*
Load limit (lbs/day) per outfall	= (107,000 gpd) **x** (55.6 mg/L) **x** (8.34 x 10^{-6})
Load limit (lbs/day) per outfall	= 49.7 lbs/day

The WQBELs are summarized in Table 7.

B. Phosphorus

Phosphorus is removed mainly through soil sorption processes, which are slow and vary based on soil composition. The total phosphorus (TP) limitations are imposed to ensure that the quality of the effluent meets the water quality standard prior to discharge into any surface water [ARM 17.30.715(1)(e)]. The effluent limits do not include a concentration limit for phosphorus because of the method used to determine compliance with the 50-year breakthrough criteria. The 50-year breakthrough nondegradation criterion is based on the amount of soil available to adsorb the phosphorus between the discharge point and the surface water and the average load of phosphorus from the wastewater source. Total phosphorus of 10.6 mg/L is consistent with the concentration found in residential wastewater. The estimated load from this facility is approximately 9.46 pounds per day (lbs/day). The adsorption capacity of the soil is based on the total load of phosphorus, it is not concentration dependent.

The nearest downgradient receiving surface water is St. Mary Lake. It is located 2,670 feet west (hydraulically downgradient) of the IP ponds. A phosphorous breakthrough analysis based on average daily flow for the year of 2006, shows the breakthrough time to the surface water is 137.4 years.

C. E-Coli Bacteria

A wastewater treatment system that is sited and operated properly should remove most, if not all, of the pathogenic bacterial indicators within 2 to 3 feet of the IP pond's infiltrative surface (USEPA, 2002). The E-coli water quality standard is <1 organism per 100 ml in the ground water (DEQ Circular 7, 2/06). Based on the following site-specific criteria, ground water monitoring for E-coli bacteria at the hydraulically downgradient edge of the IP ponds will not be required at this time.

- The effluent will undergo ultraviolet (UV) disinfection treatment prior to being released to the IP ponds and finally discharged to the ground water (see Part XI. "Compliance Schedule" of this statement of basis).

In addition, the slow rate IP ponds will minimize saturated conditions and maximize the die-off rate in the natural sediments. The IP ponds discharge effluent approximately 2 feet below the ground surface. The depth to ground water at this site currently ranges from 26 to 47 feet below the TOC, however this does not account for the potential for mounding to occur directly beneath the IP ponds. This may still provide an adequate soil-subsoil column where treatment may occur naturally in the unsaturated zone.

D. BOD5 and TSS

BOD_5 and TSS are monitored to ensure the effective removal of biological material and the proper treatment of wastes. There are no numeric ground water quality standards for BOD and TSS, however according to ARM 17.30.1006(1)(b)(ii) the beneficial uses for a Class I ground water must be maintained. BOD and TSS are not subject to nondegradation unless they have a reasonable potential to affect a beneficial use based on the significance criteria for BOD and TSS, which are narrative [ARM 17.30.715 (1)(g) and DEQ Circular 7].

Table 7. Water Quality-Based Effluent Limits for Outfall 001 (at the effluent sampling location prior to discharge to the IP Ponds)

Parameter	Daily Maximum[(1)] Concentration (mg/L)	90-Day Average Load[(1)] (pounds per day)
Total Nitrogen, as N [TN]	55.6	49.7
Total Phosphorus, as P [TP]	NA	9.46

(1) See definitions, Part V of the permit
NA Not Applicable

IX. PROPOSED FINAL EFFLUENT LIMITS

The proposed effluent limitations for Outfall 001 through 004 are summarized in Table 8 and are based on the more restrictive of the technology and water quality criteria discussed in previous sections. The final proposed effluent limit for TN is water quality-based, relating to the expected performance of the extended aeration-activated sludge system and the slow IP ponds with proper operation and maintenance. The TN load limit is proposed based on the design capacity and the WQBEL concentration. The concentration limit is proposed to ensure the system operates with an effluent concentration of TN at Outfall 001 through 004, not to exceed 52 mg/L beneath the IP ponds and is based on the water quality standard not to exceed 10 mg/L of nitrate (as N) in ground water at the boundary of the standard 500-foot ground water mixing zone

The effluent limit for TP is a water quality-based, narrative standard. The water quality-based effluent load limit considers the assimilative capacity of the soil system to estimate the maximum load of phosphorus discharged to the ground water. The 90-day average load limit will provide protection for the surface and ground water.

Table 8. Numeric Effluent Limits for Outfall 001 through 004 (at the sampling location prior to discharge to IP Ponds)

Parameter	Daily Maximum Concentration [(1)] (mg/L) per Outfall	90-Day Average Load[(1)] (pounds per day) per Outfall
Total Nitrogen, as N (TN)[(2)]	55.6	49.7
Total Phosphorus, as P (TP)	NA	9.46

(1) See definitions, Part V of the permit.
(2) Total Nitrogen (TN) is the sum of nitrate, nitrite and total Kjeldahl nitrogen (as N).
NA Not Applicable

Other Discharge Limitations:

The annual average design flow of effluent discharged to Outfall 001 through 004 shall not exceed 107,000 gpd.

X. MONITORING REQUIREMENTS

A. Influent Monitoring

Influent monitoring will be required as a condition of the permit. Influent samples shall be collected from the comminuter vault where the force main and gravity flows combine prior to entering the aeration basins (see Attachment 2). Wastewater collected at this proposed sampling location is

considered to be raw sewage since it has not received any treatment. The influent shall be sampled for the parameters listed in Table 9 according to the frequency and the sample type indicated on the table. Secondary treatment standards require the calculation of the percent removal of BOD and TSS (see Table 5). Reports will be submitted on a monthly schedule.

TABLE 9. Parameters To Be Monitored in the Influent

Parameter, units	Frequency	Sample Type(1)
Total Suspended Solids,(TSS), mg/L	Monthly	Composite
Biological Oxygen Demand (BOD_5), mg/L	Monthly	Composite

(1) See definitions, Part V of the permit

B. Effluent Monitoring

Effluent monitoring is essential to ensure the effective treatment and consistency of the wastewater discharged from the facility. The effluent limits are established to protect the ground water from a change in water quality that would exceed water quality standards (DEQ, Circular 7) or cause a change in beneficial use [ARM 17.30.1006(1)(a)]. Samples or measurements shall be representative of the volume and nature of the monitored discharge at the outfalls.

Effluent monitoring/sampling shall be conducted by collecting a composite and/or grab sample (see Table 8) from the wastewater treatment system effluent discharge at the V-notch weir in the disinfection tank (see Attachment 2) that is most representative of the effluent quality prior to discharging to the IP ponds (Outfall 001 through 004). Effluent samples shall be submitted to the laboratory for analyses of all of the parameters in Table 9.

The permittee shall monitor the effluent discharged to Outfall 001 through 004 for the parameters in Table 10 and at the frequency and with the type of measurement and sampling as indicated.

Reports shall be submitted on a monthly schedule. If no discharge occurs during the entire monitoring period, it shall be stated in a Discharge Monitoring Report (DMR) that “no discharge” occurred.

Table 10. Outfall 001 Effluent Parameters Monitored/Sampled prior to discharge to the IP Ponds

Parameter, units	Frequency	Sample Type(1)
Effluent Flow Rate, gpd(2)	Continuous	Continuous
Total Suspended Solids (TSS), mg/L	Monthly	Composite
Biological Oxygen Demand (BOD_5), mg/L	Monthly	Composite
pH, s.u.	Monthly	Grab
Total Phosphorus,as P (TP)(3), mg/L	Monthly	Composite
Nitrate + Nitrite (as N), mg/L	Monthly	Composite
Oil and Grease, mg/L	Quarterly	Grab
Total Kjeldahl Nitrogen (TKN) (as N), mg/L	Monthly	Composite
Total Nitrogen, as N (TN), mg/L	Monthly	Calculated(4)
Total Nitrogen, as N (TN), lb/da(5)	Monthly	Calculated(6)

Total Phosphorus, as P (TP), lb/da[5]	Monthly	Calculated[6]

(1) See definitions in Part V of this permit.
(2) To be measured by a recorder or totalizing flow meter.
(3) EPA Method 365.1 or equivalent
(4) Total Nitrogen (as N) TN = (nitrate + nitrite, as N) + total Kjeldahl (TKN)
(5) Average daily load calculations: lb/da = concentration (mg/L) x flow (gpd) x 8.34 x 10^{-6}
(6) See definition of "quarterly average" in Part V of this permit..

The 30-day average load for TN and TP are the sum of the calculated loads for each TN and TP sample collected within the 30-day period, divided by the number of samples collected and analyzed for TN and TP.

The effluent flow measurement method shall be either by recorder or totalizing flow meter; dose counts or pump run-times will not be accepted for new wastewater systems. The permittee shall monitor the flow of the effluent for Outfall 001 through 004 prior to entering the IP ponds on a daily frequency. The permittee shall report the flows for Outfall 001 through 004 based on the average for each month. The permittee has stated the method of flow monitoring is presently a Fischer Porter Totalizing flow meter. The flow meter is located after the aeration basins and clarifier which shall be followed with UV disinfection to discharging to the respective (4) IP ponds. Installation of a new effluent totalizing flow meter has been proposed by GNP at this facility.

Rationale for Effluent Monitoring
National Secondary Treatment Standards for BOD and TSS (40 CFR 133) ensure the minimum level of effluent quality is attained as measured by BOD_5, TSS, percent removal of BOD_5 and TSS, as well as pH.

pH – Effluent pH from Outfalls 001 through 004 shall remain between 6.0 and 9.0 standard units (s.u.) (instantaneous minimum and instantaneous maximum). Monitors effluent quality to ensure the discharge is domestic-residential strength waste.

Total Nitrogen (TN) compliance with Level II treatment requirements

Total phosphorous is established from narrative limits with a load limit based on flow and average concentration.

Oil and Grease no visible sheen, in order to maintain efficient operation of the treatment system.

C. Ground Water Monitoring

Ground water monitoring will be required in this permit due to the following site-specific criteria:

- The depth to shallow ground water ranges from 26 to 47 feet bgs, not including the potential for mounding to occur beneath the IP ponds.
- Shallow soils and subsoils in this area consist of coarse sand, gravel, and boulders deposited as an alluvial fan by Divide Creek.
- The facility and the existing ground water monitoring wells are in the 100-year floodplain.
- St. Mary Lake is 2,670 feet from the hydraulically downgradient side of Outfall 002 and 004, with a high potential for hydraulic connection in the shallow ground water.

The permittee is required to monitor the ground water quality at the hydraulically downgradient boundary of the proposed standard 500-foot ground water mixing zone. The location of the monitoring well (MW1A) shall be 500 feet from the northwest side of IP Ponds #2 and #4 in a N45°W direction (nearly paralleling the Going to the Sun Road (see Attachment 3). Any deviation from this required monitoring well location must be approved by the Department prior to well installation.

The ground water monitoring well (MW1A) will serve as a monitoring point for the standard 500-foot ground water mixing zone. MW1A will also serve as a detection monitoring well for E-coli bacteria, to ensure the UV disinfection treatment system is operating effectively. If UV treatment is not installed as designed (see Attachment 2), an additional shallow ground water monitoring well will be required to be constructed at the hydraulically downgradient (northwest) side of IP ponds #2 and #4.

MW1A shall be screened in the first shallow aquifer approximately from the top of the high ground water table to10 feet below the low water table with a total screened interval not to exceed 25 feet.

The ground water monitoring well must be installed by a licensed monitoring well driller, according to monitoring well construction standards in ARM Title 30, Chapter 21, Subchapter 8. MW1A must be constructed and secured according to ARM 17.50.707. A copy of the completed driller's log must be submitted to the Department no later than 60 days from the date of permit issuance. The parameters to be monitored and the sampling frequency for the monitoring well are given in Table 11.

Table 11. Ground Water Monitoring Parameters for Monitoring Wells MW1A

Parameter, units	Frequency	Sample Type(1)
Static Water Level (SWL) (feet below top of casing)	Quarterly	Instantaneous
E-Coli Bacteria, organisms/100 ml	Quarterly	Grab
Nitrate + Nitrite (as N), mg/L	Quarterly	Grab
Total Kjeldahl Nitrogen (TKN), mg/L	Quarterly	Grab
Total Nitrogen (TN), mg/L	Quarterly	Grab
Specific Conductivity, μmhos/cm	Quarterly	Grab
Total Phosphorous (TP), mg/L	Quarterly	Grab
Chloride, mg/L	Quarterly	Grab

(1) See definitions in Part V of this permit.

Rationale for Ground Water Monitoring

SWL measurements are required to observe seasonal fluctuations (if any) in the depth to shallow ground water to ensure there is at least 4 feet of unsaturated soils separation from the base of the IP ponds to the top of the ground water all year long. The depth to shallow ground water would also monitor potential evidence of increased volumes in the ground water due to the added source.

E-coli bacteria is sampled to maintain pathogen-free ground water immediately adjacent to the IP ponds. There is no mixing zone for E-coli bacteria.

Nitrate + Nitrite (as N) to ensure compliance at the end of the mixing zone, as well as the human health standard-water quality standard (DEQ Circular 7) of 10 mg/L in the ground water.

Total Kjeldahl Nitrogen (TKN) to monitor the efficiency of the wastewater treatment system.

Total phosphorous is a nutrient. Compliance with narrative standards apply as well as the load based limit in the effluent.

The monitoring of chloride and specific conductance is used as indicators of potential impacts from the wastewater to the ground water.

Ground water sample collection, preservation and analysis shall be conducted according to ARM 17.30.1007 and "Non-Point Source Water Quality Standard Operating Procedures" (4/1/95) at www.deq.state.mt.us/wqinfo/monitoring/SOP/Sap.asp, until the permit is issued.

No later than 60 days from the date of permit issuance, the permittee shall develop and maintain onsite a site specific Standard Operating Procedures(SOP)/ Operations and Maintenance (O&M) Plan and a Sampling and Analysis Plan (SAP) for monitoring and sampling the ground water monitoring well(s).

D. Corrective Action – Ground Water Compliance Limits

The ground water trigger values and water quality standards for monitoring well MW1A are listed in Table 12. An exceedance of a ground water trigger value for nitrate (as N) in MW1A demonstrates that the compliance limit has been exceeded at the boundaries of the mixing zone as a result of the permitted discharge at Outfall 001 through 004.

An exceedance of the ground water compliance limit for E-coli bacteria (less than 1 organism per 100 ml.) at the end of the mixing zone would trigger the installation of a ground water monitoring well at the downgradient edge of the drainfield because there is no mixing zone allowed for E-coli bacteria. The Department is not granting a mixing zone for E-coli bacteria.

An exceedance of a ground water compliance limit(s) will require a resample be collected from the monitoring well within 72 hours of the laboratory notification of the analytical results from the scheduled sampling event. Corrective action will need to be implemented should the analytical results from the re-sample verify the exceedance(s).

Table 12. Ground Water Trigger Values for Monitoring Well MW1A

Parameter, units	Trigger values
E-Coli Bacteria, organisms/100 ml	Equal to or greater than 1
Nitrate (as N), mg/L	10

Ground water corrective action could involve but not be limited to, one or more of the following measures based on the nature and extent of the potential impacts to the ground water quality.

- Identification of the probable cause and extent of the ground water quality changes.
- Installation of additional ground water monitoring wells, including an upgradient well.
- Increased sampling (frequency and/or constituents).
- Increase the efficiency of the wastewater treatment system.
- Reduce the amount of nutrients or other parameters discharged into the ground water.

- Additional disinfection to the effluent prior to discharge, if E-coli bacteria compliance limit was exceeded.
- Sample St. Mary Lake for surface water quality directly hydraulically downgradient from the IP ponds for at a minimum, the parameters listed in Table 9 and prepare a plan to avoid any impacts to the quality of the surface water in the lake.

XI. COMPLIANCE SCHEDULE

A compliance schedule (see Table 13) will be included in the permit to allow a reasonable opportunity for the permittee to attain compliance with the requirements issued in the permit, and lead the permittee into compliance with the Water Quality Act and Administrative Rules of Montana (ARM 17.30.1350 and ARM 17.30 Subchapter 12). Compliance must be achieved as soon as possible, but no later than the scheduled dates of compliance and interim dates for progress reports. The permittee must notify the Department in writing no later than 14 days following each interim date with a progress report and a comprehensive final report no later than 14 days from the final date of compliance.

Table 13. Compliance Schedule

Compliance Deadline Date	Applicable Citation (Law/Rule)	Action Required to Come Into Compliance
October 31, 2007	75-5-103(28), MCA "performance standard" 75-5-602(2), MCA "submit reports"	(1) Install UV treatment to effluent. Submit a report with the design, location, manufacturer and type of UV system installed. (2) Repair or replace seized valves to the IP ponds. Submit a report summarizing the final disposition of this maintenance work.
May 1, 2008	75-5-103(28), MCA "performance standard" 75-5-602(3), MCA "install monitoring equipment"	(1) UV treatment becomes operational. (2) Drill, complete, and develop a shallow ground water monitoring well at the end of the standard 500-foot ground water mixing zone.
June 1, 2008	75-5-602(2), MCA "submit reports" 75-5-602(3) "use monitoring equipment"	(1) Submit well log and well completion form on the new ground water monitoring well. (2) Begin ground water monitoring as specified in the permit.

XII. NONDEGRADATION SIGNIFICANCE DETERMINATION

The applicable water quality standards for Class I ground water criteria are summarized in Table 4. The effluent limits for total nitrogen, as N (TN) and total phosphorus (TP) are based on compliance with the water quality-based criteria at the mixing zone boundary. Secondary treatment standards are summarized in Table 5.

The Department has determined that this discharge is an existing source and the Montana Nondegradation Policy (75-5-303, MCA; ARM 17.30.702(16)) is not applicable at this site. The applicable water quality standards for Class I ground water are summarized in Table 4. The effluent limits for TN and TP are based on compliance with water quality standards. The proposed discharge

will not exceed the water quality standard for nitrate (as N) of 10 mg/L at the hydraulically downgradient boundary of the standard 500-foot ground water mixing zone.

XIII. INFORMATION SOURCES

In the development of the effluent limitations, monitoring requirements and special conditions for the draft permit, the following information sources were used to establish the basis of the draft permit and are hereby referenced:

ARM Title 17, Chapter 30, Sub-chapter 5 - Mixing Zones in Surface and Ground Water, September 1999.

ARM Title 17, Chapter 30, Sub-chapter 7 - Nondegradation of Water Quality, March 2000.

ARM Title 17, Chapter 30, Sub-chapter 10 - Montana Ground Water Pollution Control System (MGWPCS), March 2002.

Cherry, J.A. and Freeze, R. A., *Groundwater*, Prentice-Hall Inc., Englewood Cliffs, NJ., 1979. Chapter 2, pages 26-29.

Clark, M.L., Eddy-Miller, C.A., Mast, M.A., "Environmental Characteristics and Water-Quality of Hydrologic Benchmark Network Stations in the West-Central United States", U.S. Geological Survey Circular 1173-C, 2000.

DEQ Circular 4, 2004.

DEQ Circular 7 – Montana Numeric Water Quality Standards, February 2006.

DEQ, Memo-Regensberger, "Revised Modification of Phosphorous Concentration for Domestic Sewage in Nondegradation Reviews," October 29, 1998.

DEQ, "Nitrate Sensitivity Analysis Input Data", 1994.

DEQ, "Non-Point Source Water Quality Standard Operating Procedures" (4/1/95) at www.deq.state.mt.us/wqinfo/monitoring/SOP/Sap.asp

Ellis, B.K., J.A. Stanford, J.A. Craft, D.W. Chess, G.R.Gregory and L.F. Marnell, "Monitoring Water Quality of Selected Lakes in Glacier National Park, Montana: Analysis of data collected, 1984-1990." Open File Report 129-92, December 1992.

GWIC Database, http://mbmggwic.mtech.edu

Moreland, J.A. and W. A. Wood, "Appraisal of Ground-Water Quality Near Wastewater Treatment Facilities, Glacier National Park, Montana, U.S. Geological Survey Water-Resources Investigations 82-4 (1982).

U.S. Department of Agriculture, Natural Resources Conservation Service, Soils Data, 10/25/05, 3/24/06 and http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

U.S. Environmental Protection Agency, Rev September 2000. U.S. EPA NPDES Permit Writers' Course, Helena, Montana, September, 2000, Workbook EPA 833-B-97-001.

U.S. Environmental Protection Agency, February 2002. *Design Manual: Onsite Wastewater Treatment and Disposal System*. EPA 625/R-00/008, p. 3-29 (Table 3-19) and Fact Sheet TFS-9 "Fixed Film Processes", and Table 1, TFS-51.

Western Groundwater Services, "St. Mary WWTP Aquifer Testing Report," December 29, 2006.

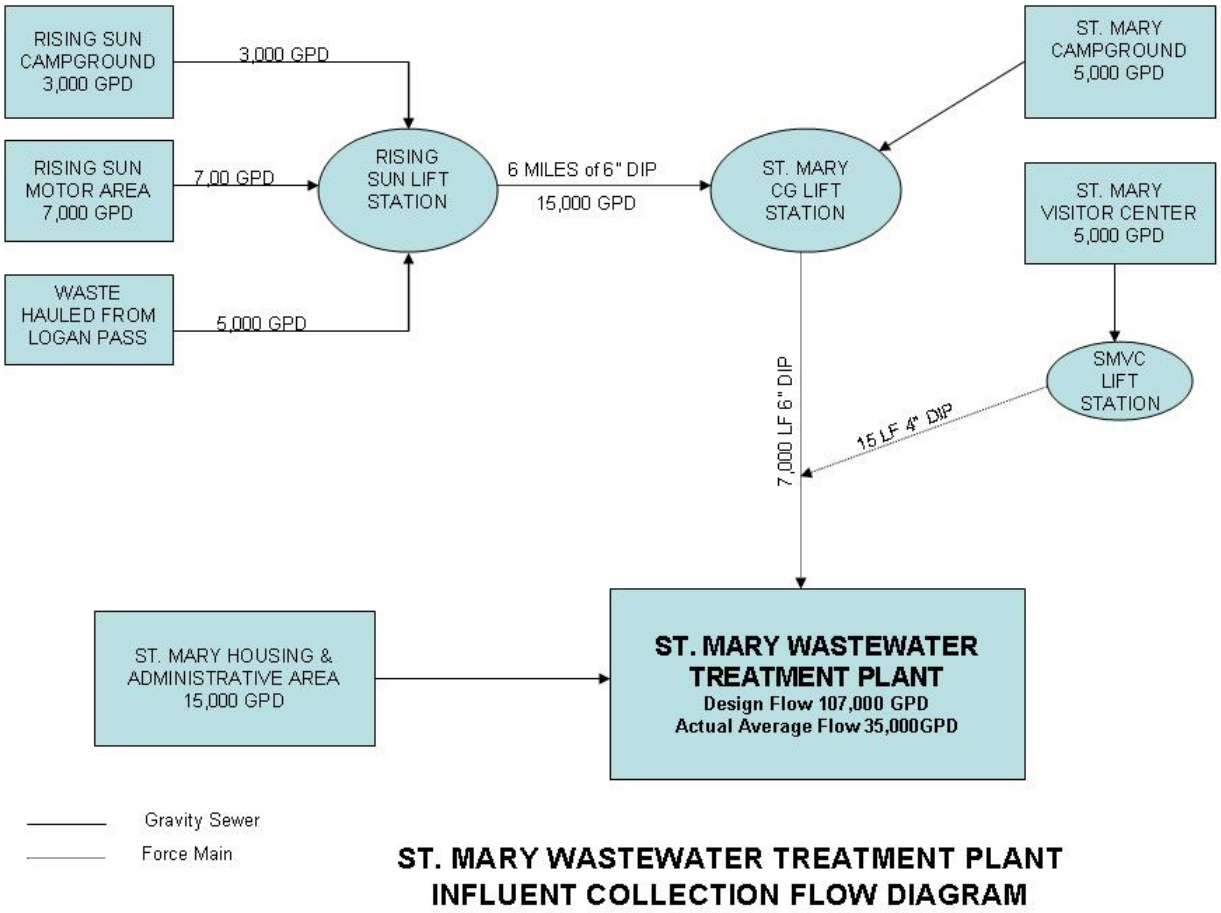
XIV.ATTACHMENTS

1 – Wastewater Influent Collection System Diagram

2 - Wastewater Treatment Plant Flow Line-Diagram

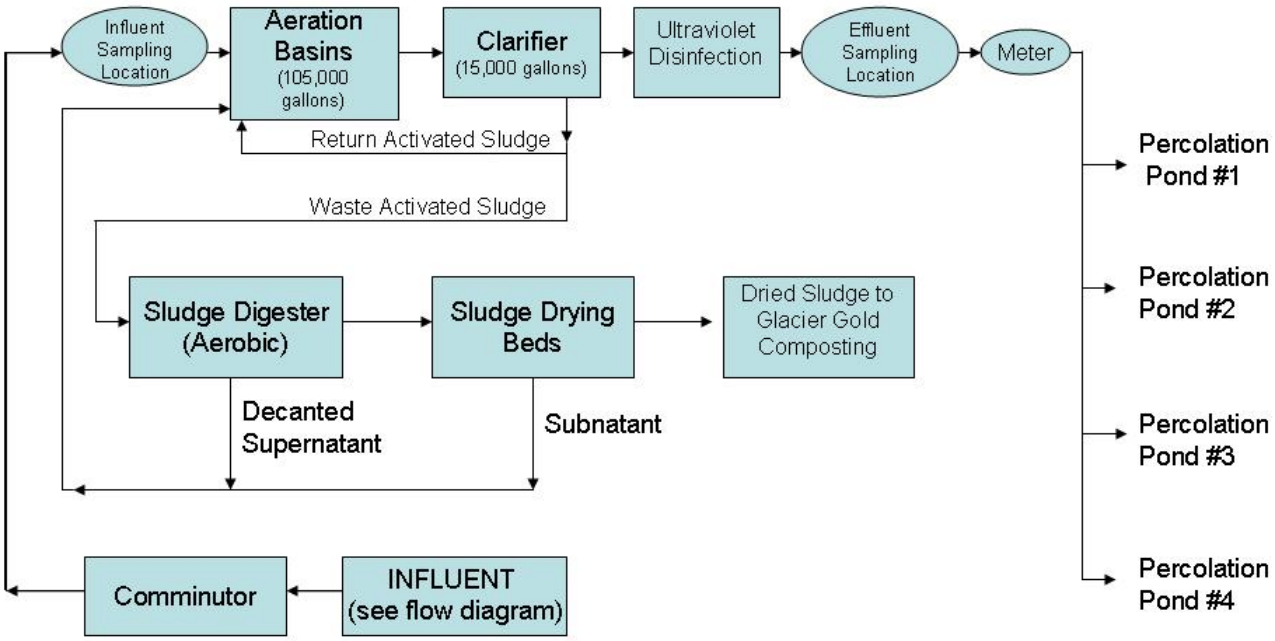
3 – Site Map with the Ground Water Mixing Zone and the proposed Ground Water Monitoring Well Location at the end of the Mixing Zone

Prepared by: Pat Potts **Date:** June 5, 2007



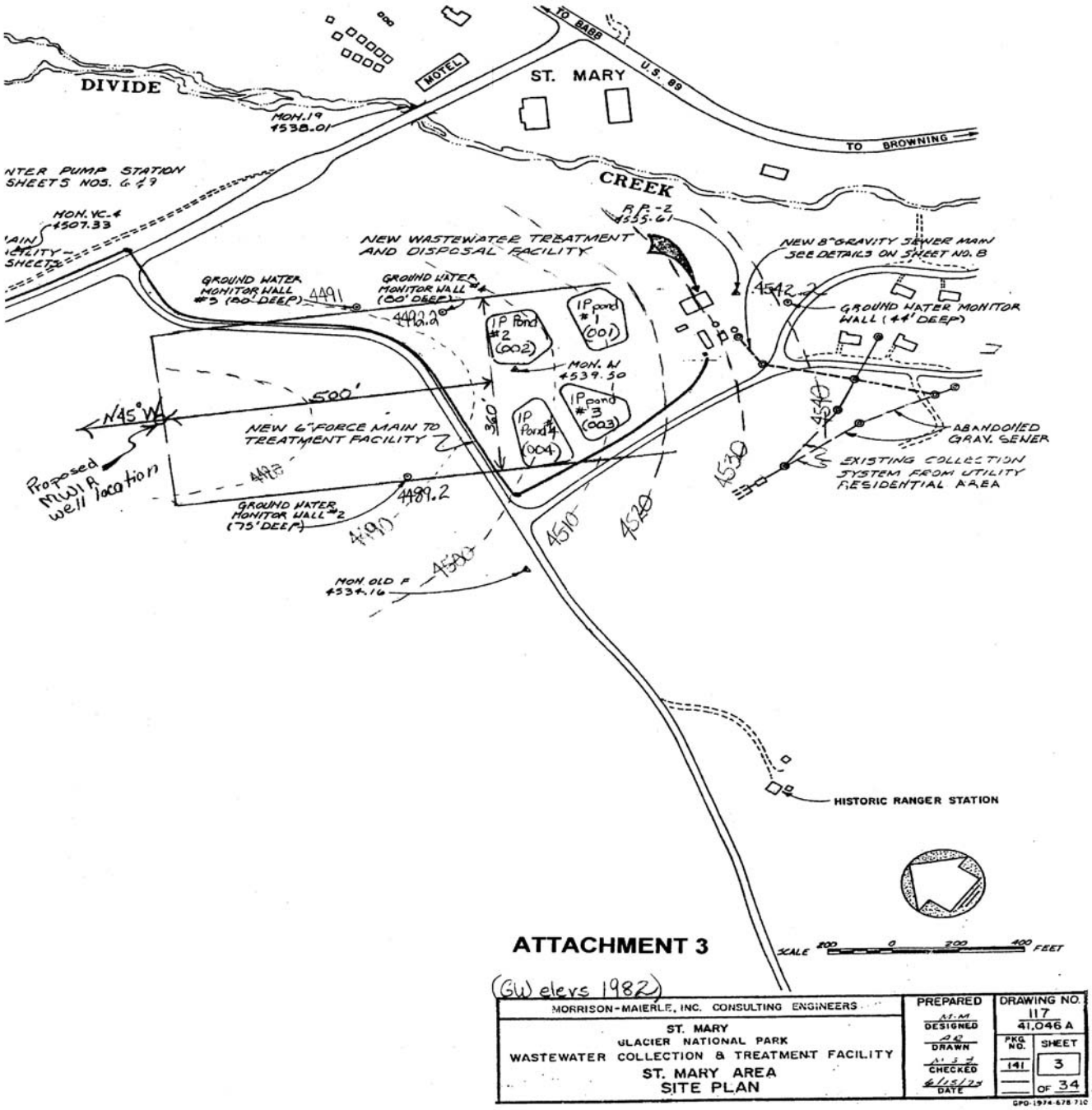
ST. MARY WASTEWATER TREATMENT PLANT
INFLUENT COLLECTION FLOW DIAGRAM

ATTACHMENT 1



ST. MARY WASTEWATER TREATMENT PLANT
PLANT FLOW DIAGRAM

ATTACHMENT 2


DIVIDE
MOTEL
ST. MARY
TO BABB
U.S. 89
TO BROWNING
MON. 19
4538.01
CREEK
NEW WASTEWATER TREATMENT AND DISPOSAL FACILITY
NEW 8" GRAVITY SEWER MAIN SEE DETAILS ON SHEET NO. 8
GROUND WATER MONITOR WELL #3 (80' DEEP)
GROUND WATER MONITOR WELL #4 (60' DEEP)
IP Pond #1 (001)
IP Pond #2 (002)
IP Pond #3 (003)
IP Pond #4 (004)
MON. W 4539.50
GROUND WATER MONITOR WELL (44' DEEP)
4542.2
N45°W
500'
NEW 6" FORCE MAIN TO TREATMENT FACILITY
360'
Proposed MW/R well location
GROUND WATER MONITOR WELL #2 (75' DEEP)
4489.2
ABANDONED GRAV. SEWER
EXISTING COLLECTION SYSTEM FROM UTILITY RESIDENTIAL AREA
4510
4520
4530
4540
4580
HISTORIC RANGER STATION
SCALE 800 0 400 800 FEET
ATTACHMENT 3
(GW elevs 1982)
MORRISON-MAIERLE, INC. CONSULTING ENGINEERS
ST. MARY
GLACIER NATIONAL PARK
WASTEWATER COLLECTION & TREATMENT FACILITY
ST. MARY AREA
SITE PLAN
PREPARED
DESIGNED
DRAWN
CHECKED
6/15/73
DATE
DRAWING NO.
117
41,046 A
PKG. NO. 141
SHEET 3 OF 34